

REMARKS

Claims 1-7 are pending in the application. Claim 1 is rejected. Claims 2-7 are allowed. All rejections are respectfully traversed.

The invention simulates motion of a static 3D physical object in a static scene, see Figure 9. For example, the object is a toy wooden car, and the scene is a white paper backdrop. A 3D graphics model is acquired of the 3D object and the scene. A projector is then registered with the 3D object, the scene and the 3D graphics model. The 3D graphics model is segmented into a plurality of parts, e.g., the wheels, the car body, and road, the countryside. The parts are edited to reflect a desired appearance and virtual motion of each part. For example, the wheel parts are made to rotate, while the road moves backwards underneath, and the countryside slides by. The edited parts are rendered as an animation video. Finally, the object and scene are illuminated with the video to give the appearance of the car speeding down the road through the countryside.

It is stressed that it is the integration of the apparently moving **object** into an apparently **moving** scene that gives the illusion of reality. The Examiner should note that none of the references, nor combination of the references, integrate a moving object with a moving scene in their projections.

Claims 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Stegmann et al. (6,415,050 - Stegmann) in view of LaChapelle et al. (6,163,322 - LaChapelle), in further view of Rush (3,707,115).

The invention acquires a 3D graphics *model* of a 3D physical *object* and a *scene*.

The Examiner cites column 1, lines 5-10

This application claims the benefit of provisional application 60/025,334 filed Sep. 3, 1996.

This invention relates to a Virtual Design System that uses a mathematical 3D model of a real world object, performs an application of a design on that model, and which can be combined with an Optical Projection System to visualize the design and/or design data on the real world object.

and lines 15-25

of an object from different perspectives, change of light sources, shadowing, rendering, animation, and related features. These standard systems represent a real world object internally as a mathematical model, which incorporates the three-dimensional data of the object in form of primitives such as lines, polygons and solid bodies, and an instruction set of the operations which can be performed to manipulate the data. Application of designs on 3D objects with help of these systems is done in the form of rendering techniques. Bitmap patterns are projected on the 3D-object for visualization purposes only, this is called texture mapping. For

and lines 58-63

bands, ribbons and other decorating aid that is applied prior to painting or decorating an object, or simply the visualization of the design outline on the real object), engineering (providing the possibility to give instant feedback to the providers of the CAD model or the technical designers) and marketing or sales (for example for the presentation of the decorated CAD model to a customer, or for the generation of a computer animation). The subject matters of the document U.S. Pat. No. 5,490,080 are a method and a device for decorating a tridimensional object wherein a computer visu-

None of these sections mention anything about a *scene*. The Stegmann model **cannot** include the scene since Stegmann does not consider scene.

The invention registering a projector with the 3D physical object, the *scene* and the 3D graphics *model*.

Again, the Examiner cites lines 5-10. No scene is mentioned there.

The Examiner's characterization of Stegmann, with all due respect, is erroneous.

Stegmann does not and cannot segment the 3D graphics model (which includes the scene) into a plurality of parts, and edit the parts, which include the scene, with graphics authoring tools to reflect a desired appearance and virtual motion of each part, or render the edited parts in real-time as an animation video.

Stegmann does not illuminate the 3D physical *object* and the *scene* with the animation video to give the 3D physical object and the *scene* the **desired appearance and virtual motion**. Stegmann projects only from fixed viewpoints, column 5, lines 45 et seq. There is no animation or motion.

Stegmann does not describe, teach, show or suggest the claimed acquiring, registering, segmenting, editing, rendering, and illuminating steps of the invention.

That is, the invention integrates the 3D physical object and the scene with the animation video to give the 3D physical object and the scene the desired appearance

and virtual motion. Stegmann describes none of this. There is no motion in Stegmann, and there is no scene.

Because the Stegmann method does not consider anything but an object, in an otherwise empty space, a true virtual reality environment cannot be obtained. For example, the present invention can give the illusion of a car speeding down a road, even though the real world object and real world background remain in a fixed relationship to each other. The invention can make a plane move through the sky, or if the scene is a sea, a boat can be made to sail through the waves. It is the differential rendering of the object and the scene that gives the claimed desired appearance and virtual motion of the object through the scene.

Applicants respectfully request which word, or phrase in this cited section refers to the 'scene' in which the Stegmann object is placed. Lacking a scene severely limits the 3D virtual realism possible. The claimed invention models and renders a scene as well as the object. Also, there is a complete lack of motion for either the object or the scene in Stegmann.

The Examiner in the initial office action characterized Stegmann as considering the scene. Applicants in their response pointed out this characterization was erroneous. Still, the Examiner in the current office action again characterizes Stegmann as considering the scene. Applicants respectfully must point out, that this characterization is still erroneous.

Stegmann lack all of the following elements of claim 1,

“acquiring a 3D graphics model of the scene,”

“registering a projector with the scene,”

“segmenting the 3D graphics model” having a scene parts

“editing each of the part” including the scene parts,” and

“illuminating the scene to give the scene the desired appearance and virtual motion.”

In addition, Stegmann only considers static images. Nowhere in Stegmann is there any indication that the rendered images give an appearance of motion. Stegmann does not produce an animation video to decorate both an object and a scene.

It should be obvious to one of ordinary skill in the art that an object in a void, as in Stegmann, can never be given the appearance of moving with respect to the void.

In sum, Stegmann does not perform *any* of the six claimed steps. Therefore, no matter what additional art is applied, Stegmann in combination with anything, other than the present invention, can never teach, suggest, show or describe what is claimed.

LaChapelle only deals with animating body parts. LaChapelle does not provide the required scene as claimed. LaChapelle does not cure the numerous defects in Stegmann. Stegmann in combination with LaChapelle does not make the invention obvious.

Furthermore, LaChapelle cannot be combined with Stegmann. LaChapelle models synthetic objects, not real world objects. Furthermore, LaChapelle does not consider

how to project his animation onto a real world 3D object and a real world 3D scene. LaChapelle outputs only to a flat 2D screen. The third dimension is not considered by LaChapelle. LaChapelle cannot be combined with Stegmann.

Rush does not acquire a model of an object and a scene. Rush does not animate an object and a scene containing the object. Furthermore, the invention claims “registering a projector with the **3D physical object**, the **scene** and the **3D graphics model**. Rush only deals with registering with a screen surface, see column 1.

ferent changes in the basic scenery as desired. By accurately registering the camera position relative to the basic three-dimensional screen surface each time a 50 photograph is taken, and by similarly registering the projector relative to such surface, any number of

Rush does not cure the defects of both Stegmann and LaChapelle.

In view of the foregoing, it is respectfully submitted that the application is in condition for allowance and an early indication of the same is courteously solicited. The Examiner is respectfully requested to contact the undersigned by telephone at the below listed telephone number, in order to expedite resolution of any remaining issues and further to expedite passage of the application to issue, if any further comments, questions or suggestions arise in connection with the application.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of

this paper, including extension of time fees, to Deposit Account 50-0749 and please credit any excess fees to such deposit account.

Respectfully submitted,
Mitsubishi Electric
Research Laboratories, Inc.

A handwritten signature in black ink, appearing to read 'A. Curtin', written over the printed name.

Andrew J. Curtin
Registration No. 48,485

201 Broadway, 8th Floor
Cambridge, MA 02139
Telephone: 617-621-7573
Facsimile: 617-621-7550